

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-036399

(43)Date of publication of application : 05.02.2002

(51)Int.Cl.

B31F 1/10

B26D 1/24

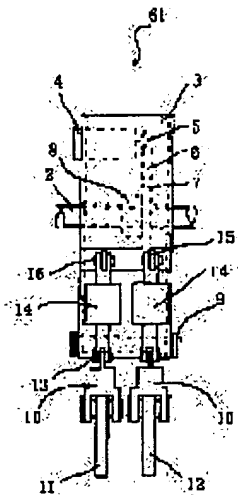
(21)Application number : 2000-219081

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(22)Date of filing : 19.07.2000

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(54) SLITTER SCORER



A 図  
2: 上ヘッドのフレーム  
10: アーム (昇降アーム)  
11, 12: 上巻繰ロール  
61: 上ヘッド

(57)Abstract:

PROBLEM TO BE SOLVED: To achieve the enhancement of the bending accuracy of a corrugated cardboard sheet and the reduction of production cost in a slitter scorer.

SOLUTION: The slitter scorer, which applies rule processing to the corrugated cardboard sheet in the running direction thereof and cuts the corrugated cardboard sheet in the running direction and has an upper head 61 and a lower head, is equipped with a plurality of lift arms 10 respectively independently provided to the frame 3 of the upper head 61 in a liftable manner, a plurality of upper rule rolls 11 and 12 respectively provided to the leading ends of the arms 10 and having different leading end shapes and a plurality of lower rule rolls provided to the frame of the lower head and having different leading end shapes. A plurality of the upper rule rolls 11 and 12 and a plurality of the lower rule rolls can be selectively used.

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[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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**CLAIMS**

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[Claim(s)]

[Claim 1] In the transit direction of the corrugated paper sheet from a colgater line, while carrying out ruled line processing In the slitting machine scorekeeper who has the upper head arranged as sandwiched this corrugated paper sheet that is the slitting machine scorekeeper who cuts in the transit direction, and runs this corrugated paper sheet, and a bottom head Two or more rise-and-fall arms respectively prepared in the frame of this upper head independently possible [ rise and fall ], Two or more upper ruled line rolls which were formed at the tip of each above-mentioned arm, respectively and with which tip configurations differ mutually, The slitting machine scorekeeper who offers the bottom ruled line roll of the plurality from which a tip configuration differs mutually formed in the frame of the bottom head of this, respectively, and is characterized by constituting alternatively two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality usable.

[Claim 2] In the transit direction of the corrugated paper sheet from a colgater line, while carrying out ruled line processing He is the self-propelled slitting machine scorekeeper who cuts this corrugated paper sheet in the transit direction. The slitting machine scorekeeper who has the upper head arranged as sandwiched this corrugated paper sheet it runs, and a bottom head Multi-unit preparation and the rise-and-fall arm prepared in the frame of this upper head in the slitting machine scorekeeper of each above-mentioned unit, The upper ruled line roll formed at the tip of this arm, respectively and the bottom ruled line roll formed in the frame of the bottom head of this in the slitting machine scorekeeper of each above-mentioned unit are offered. The tip configuration of this upper ruled line roll and the tip configuration of the bottom ruled line roll of this are a slitting machine scorekeeper characterized by constituting alternatively two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality usable while a mutually different thing between each unit is adopted.

[Claim 3] The tip configuration of each above-mentioned up ruled line roll and each Shimo ruled line roll is a slitting machine scorekeeper according to claim 1 or 2 characterized by being set up according to the class of regular corrugated paper sheet.

[Claim 4] A slitting machine scorekeeper given in the term of either of claims 1-3 which is characterized by performing control so that two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality may be used according to the class of corrugated paper sheet to process, choosing them automatically.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the slitting machine scorekeeper who performs ruled line ON processing and slit processing along the flow direction of a corrugated paper sheet in the colgater which manufactures a corrugated paper sheet.

[0002]

[Description of the Prior Art] In the colgater which manufactures a corrugated paper sheet, the broad corrugated paper sheet continuously manufactured with the colgater line is sent to a slitting machine scorekeeper, it \*\*\*\*\* at the narrow web (two or more webs usually) of width of face predetermined with a slitting machine to a flow direction, and ruled line processing for making a corrugated paper sheet easy to bend by the scorekeeper is performed.

[0003] Drawing 6 shows a common self-propelled slitting machine scorekeeper's configuration. As are shown in drawing 6, and a slitting machine scorekeeper usually shows by M and N, it consists of two units arranged in \*\*\*\*\* of a corrugated paper sheet, and while one unit works, the unit of another side is made to perform dead works, such as setting \*\*\*\*\*, for lot modification. Each units M and N are constituted similarly, and in drawing 6, both units are distributed and they are describing the sign so that the sign of the component of each unit may not crowd. Moreover, the arrow head in drawing 6 shows the transit direction of the corrugated paper sheet 31.

[0004] Upper ruled line equipment 65 and down-stream ruled line equipment 66 are countered and arranged in each units M and N focusing on the frame 35. The slitting machine 64 for cutting the corrugated paper sheet 31 in the transit direction is formed in the downstream part of each units M and N, and this slitting machine 64 is a pair as knife cradle 33a and slitting machine knife 33b sandwich the corrugated paper sheet 31. The trim duct 34 is formed in the nearest to down-stream of a slitting machine 64.

[0005] Upper ruled line equipment 65, down-stream ruled line equipment 66, and two or more sets (in the case of four-dish \*\* usually 8 sets of ruled lines, 5 sets of slitting machines) of slitting machines 64 are formed in the cross direction of the corrugated paper sheet 31, and two or more ruled line processings and cutting processings are performed to coincidence. Drawing 7 is the top view showing the situation of performing ruled line processing and \*\* picking, and shows the example of four-dish picking. As shown in drawing 7, the stand 35 is being fixed to the engine frames 67a and 67b set up by the both-sides side, and the rail 36 is being fixed to the stand 35 by the cross direction of the corrugated paper sheet 31. The arrow head in drawing 7 shows the transit direction of the corrugated paper sheet 31.

[0006] Although explained in full detail behind, upper ruled line equipment 65 and down-stream ruled line equipment 66 move along with a rail 36, and can be set now as the location of the arbitration of the cross direction in the corrugated paper sheet 31, and a slitting machine 64 can set them as the location of arbitration similarly. If the corrugated paper sheet 31 from a colgater line is now introduced into a slitting machine scorekeeper, ruled line processing is respectively performed by upper ruled line equipment 65 and down-stream ruled line equipment 66, and it will be cut by the slitting machine 64 in the transit direction, and will be sent to degree process.

[0007] At this time, a part larger than the predetermined width of the corrugated paper sheet 31, i.e., the handle part of both ends, is cut to band-like, and it draws in and processes into the trim

duct 34. In addition, as drawing 7 shows having divided the ruled line equipments 65 and 66 into the upstream and the downstream, and arranging them alternately, the narrow thing of spacing between adjoining ruled lines is more common than a slitting machine, and it is because spacing between ruled lines can be contracted, without the adjoining ruled line equipments 65 and 66 interfering mutually.

[0008] Next, if upper ruled line equipment 65 and down-stream ruled line equipment 66 are explained to a detail, it is only that the part became an opposite kitchen, and since structure and the function are completely the same, both 65 and 66 will explain down-stream ruled line equipment 66 here. The upper head 61 and the bottom head 62 become a pair in the vertical direction, and down-stream ruled line equipment 66 is constituted, as shown in drawing 6.

[0009] First, the configuration of the upper head 61 is explained. As shown in drawing 6 and drawing 8, the rail 36 is being fixed to the stand 35 by the cross direction of the corrugated paper sheet 31, and the frame 37 is attached in the rail 36 possible [ sliding ]. By the pin 38, the arm 39 is attached in the lower part of a frame 37 free [ rotation ]. Upper ruled line roll 32a is attached in one point of an arm 39 through bearing by the pin 40. And the cylinder 41 is attached between other points of an arm 39, and a frame 37, by telescopic motion of a cylinder 41, an arm 39 rotates centering on a pin 38, and upper ruled line roll 32a goes up and down up and down.

[0010] The servo motor 42 is attached in the upper part of a frame 37, and the driver 46 which fixed the servo motor 42 to the nut 45 of a ball thread which gets into gear on the \*\*\*\* shaft 44 through an intermediate gear 43 by carrying out a rotation drive is rotated. Therefore, while the nut 45 of a ball thread carries out forward inverse rotation in accordance with the \*\*\*\* shaft 44 and a frame 37 slides on a rail 36 top by carrying out the forward inversion of the servo motor 42, it can move to right and left and upper ruled line roll 32a can be set as the location of the arbitration of the cross direction in the corrugated paper sheet 31.

[0011] Next, the configuration of the bottom head 62 is explained. The stand 47 is being fixed to the engine frames 67a and 67b (refer to drawing 7) set up by the right-and-left both-sides side as shown in drawing 6. On the stand 47, the rail 48 is attached in the cross direction of the corrugated paper sheet 31, and the frame 49 is attached possible [ sliding ] on the rail 48. As shown in drawing 6 and drawing 9, in the upper part of a frame 49, the hexagon-head shaft 55 is attached in the engine frames 67a and 67b set up by the both-sides side free [ rotation ], and bottom ruled line roll 32b is being fixed to the bush 56 attached in the hexagon-head shaft 55 possible [ sliding ]. And bottom ruled line roll 32b is supported by the frame 49 free [ rotation ] through bearing 57, and bottom ruled line roll 32b rotates by carrying out a rotation drive with the driving gear which does not illustrate the hexagon-head shaft 55.

[0012] The frame 49 is connected with the nut 52 of a ball thread through bearing 50 in the lower part. And the nut 52 of a ball thread has geared with the \*\*\*\* shaft 51 fixed between engine-frame 67a and 67b. The driver 53 is being fixed to the nut 52 of a ball thread by the end face of one of these, and a driver 53 rotates a drive motor 54 in the forward inversion direction through an intermediate gear by carrying out a forward inversion drive. Consequently, a frame 49 moves to the location of arbitration on either side in accordance with the \*\*\*\* shaft 51, sliding on a rail 48 top.

[0013] Therefore, when the bottom head 62 \*\*\*\*s, it moves to a position in accordance with a shaft 51 and the upper head 61 also drives a servo motor 42 to coincidence with a drive motor 54, in accordance with the \*\*\*\* shaft 44, it moves to a position, and in order to perform ruled line processing, it is set up a top so that the bottom ruled line rolls 32a and 32b may agree. And drive rotation of the hexagon-head shaft 55 is carried out, subsequently a cylinder 41 is driven,

upper ruled line roll 32a is forced on bottom ruled line roll 32b for the corrugated paper sheet 31 by suitable thrust through an arm 39, and ruled line processing is performed so that the peripheral speed of bottom ruled line roll 32b and the travel speed of the corrugated paper sheet 31 may become equal.

[0014] Moreover, a setup of two or more sets of upper heads 61 prepared in the cross direction of the corrugated paper sheet 31 and the bottom head 62 is performed respectively independently to coincidence, predetermined spacing can be maintained and two or more ruled line processings can be performed to coincidence. As a part for the point which touches the corrugated paper sheet 31 of the bottom ruled line rolls 32a and 32b is shown in drawing 10 a top, upper ruled line roll 32a becomes a convex, and bottom ruled line roll 32b has become concave.

[0015] And are shown in the tip configuration of bottom each ruled line rolls 32a and 32b, i.e., drawing 10 , a top. The width (S) of a slot, the depth (H), a tilt angle (theta), a radius of circle (R) and the width of a projection, height (h), a tilt angle (theta), a radius of circle (r), etc. (s) In order for optimum values to differ and to improve bending precision after ruled line processing according to the class of corrugated paper sheet 31 supplied, an ideal uses the bottom ruled line rolls 32a and 32b on the optimal combination for every class of corrugated paper sheet 31.

[0016]

[Problem(s) to be Solved by the Invention] However, a top, it is necessary to pull out and to exchange out of a system, the up-and-down stand 35 and the whole stand 47, exchange of the bottom ruled line rolls 32a and 32b takes a great effort and time amount, the operating ratio fall of equipment is invited to it, and it becomes the factor of a cost rise. Furthermore, a wave amplitude also has A flute to F flute in the corrugated paper sheet 31, and, recently, even the micro flute is put in practical use. Since it is not practical to be to a single (one step), double (two steps), and triple (three steps) one, and to exchange the bottom ruled line rolls 32a and 32b a top for every class of these corrugated paper [ all ] sheets 31 also in stage formation each time, The present condition is making bending precision into a sacrifice to some extent, and supporting the class of wide range corrugated paper sheet 31 with the bottom ruled line rolls 32a and 32b on one configuration.

[0017] As it was originated in view of the above-mentioned technical problem and this invention can be changed into a bottom ruled line roll on the most suitable combination according to the class of corrugated paper sheet which incorporates the bottom ruled line roll on plurality with beforehand high operating frequency, for example, is processed, it aims at offering the slitting machine scorekeeper who enabled it to attain improvement in the bending precision of a corrugated paper sheet, and reduction of a production cost.

[0018]

[Means for Solving the Problem] For this reason, the slitting machine scorekeeper of this invention according to claim 1 In the transit direction of the corrugated paper sheet from a colgater line, while carrying out ruled line processing In the slitting machine scorekeeper who has the upper head arranged as sandwiched this corrugated paper sheet that is the slitting machine scorekeeper who cuts in the transit direction, and runs this corrugated paper sheet, and a bottom head Two or more rise-and-fall arms respectively prepared in the frame of this upper head independently possible [ rise and fall ], Two or more upper ruled line rolls which were formed at the tip of each above-mentioned arm, respectively and with which tip configurations differ mutually, The bottom ruled line roll of the plurality from which a tip configuration differs mutually formed in the frame of the bottom head of this, respectively is offered, and it is characterized by constituting alternatively two or more above-mentioned upper ruled line rolls

and the bottom ruled line roll of plurality usable.

[0019] Moreover, the slitting machine scorekeeper of this invention according to claim 2 In the transit direction of the corrugated paper sheet from a colgater line, while carrying out ruled line processing He is the self-propelled slitting machine scorekeeper who cuts this corrugated paper sheet in the transit direction. The slitting machine scorekeeper who has the upper head arranged as sandwiched this corrugated paper sheet it runs, and a bottom head Multi-unit preparation and the rise-and-fall arm prepared in the frame of this upper head in the slitting machine scorekeeper of each above-mentioned unit, The upper ruled line roll formed at the tip of this arm, respectively and the bottom ruled line roll formed in the frame of the bottom head of this in the slitting machine scorekeeper of each above-mentioned unit are offered. The tip configuration of this upper ruled line roll and the tip configuration of the bottom ruled line roll of this are characterized by constituting alternatively two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality usable while a mutually different thing between each unit is adopted.

[0020] As for the tip configuration of each above-mentioned up ruled line roll and each Shimo ruled line roll, it is desirable to be set up according to the class of regular corrugated paper sheet. Furthermore, it is also desirable that control is performed so that two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality may be used according to the class of corrugated paper sheet to process, choosing them automatically.

[0021]

[Embodiment of the Invention] Hereafter, a drawing explains the gestalt of operation of this invention. The typical side elevation in which drawing 1 - drawing 5 show the slitting machine scorekeeper as 1 operation gestalt of this invention, and drawing 1 shows the configuration of the upper head, the typical side elevation in which in drawing 2 the direction view Fig. of A of drawing 1 and drawing 3 show the B-B view sectional view of drawing 1 , and drawing 4 shows the configuration of the upper head, and drawing 5 are the C-C view sectional views of drawing 4 .

[0022] Since it is the same as usual about fundamental configuration and function of the self-propelled slitting machine scorekeeper concerning this operation gestalt, these explanation is omitted and explains a characteristic part. First, the upper head 61 of the slitting machine scorekeeper concerning this operation gestalt is explained.

[0023] By the slitting machine scorekeeper concerning this operation gestalt, as shown in drawing 1 , drawing 2 , and drawing 3 , it constructs horizontally across the engine frames 67a and 67b (refer to drawing 7 ) set up by a slitting machine scorekeeper's both-sides side (not shown a field parallel to the space in drawing 1 , and here), the stand 35 is being fixed, and the rail 1 and the \*\*\*\* shaft 2 are being fixed to the stand 35 by the machine cross direction (direction perpendicular to the space in drawing 1 ). The frame 3 is attached in the rail 1 possible [ sliding ], the servo motor 4 was attached in the upper part of a frame 3, and the gearing 5 fixed to the output shaft of a servo motor 4 meshes with a driver 7 through an intermediate gear 6. This driver 7 is being fixed to the nut 8 of a ball thread which gets into gear on the \*\*\*\* shaft 2.

[0024] The arm (rise-and-fall arm) 10 which is plurality (here 2) is attached respectively independently in the pin 9 prepared in the lower limit of a frame 3 free [ rotation ]. The ruled line roll 11 when [ 1st ] tip configurations differ respectively, and the 2nd top ruled line roll 12 are attached at one tip of each arm 10 free [ rotation ]. By the pin 13, one edge of a cylinder 14 is attached free [ rotation ], and the other end of a cylinder 14 is connected at the tip of another side of each arm 10 by the height 15 and pin 16 of a frame 3 free [ rotation ].

[0025] In this operation gestalt, although the case where it equipped with two upper ruled line rolls, the 1st and the 2nd, 11 and 12 was explained, what three or more arms 10 are formed, of course, and an upper ruled line roll is attached in each arm 10 also for, respectively (that is, it equips with three or more upper ruled line rolls) can be carried out easily. Thus, two or more (for example, about 8 sets) arrangement of the upper head 61 equipped with two or more upper ruled line rolls 11 and B12 is usually carried out on the same \*\*\*\* shaft, and the location is possible independently respectively.

[0026] Next, the bottom head 62 of the slitting machine scorekeeper concerning this operation gestalt is explained. As shown in drawing 4 and drawing 5 , it constructs horizontally across the engine frames 67a and 67b (refer to drawing 7 ) set up by a slitting machine scorekeeper's both-sides side (not shown a field parallel to the space in drawing 4 , and here), and the stand 17 is being fixed, it \*\*\*\*s to a stand 17 and the shaft 18 and the hexagon-head shaft 19 are attached in it free [ rotation ].

[0027] Furthermore, the rail 20 is being fixed to the stand 17. The frame 21 is attached in this rail 20 possible [ sliding ], and the frame 21 is connected with it through the nut 22 and bearing 23 of a ball thread which gear with the \*\*\*\* shaft 18. The driver 24 is being fixed to the nut 22 of this ball thread, and the rotation drive of the forward inverse rotation is enabled by the drive motor 26 through an intermediate gear 25.

[0028] The bottom ruled line roll 28 which is plurality from which a tip configuration differs respectively (here two pieces), i.e., the 1st bottom ruled line roll, and the 2nd bottom ruled line roll 29 are attached in the bush 27 established in the hexagon-head shaft 19 possible [ sliding ] on the other hand, and the bush 27 is further supported by the frame 21 through bearing 30.

Moreover, it is also possible to form a spacer suitable between the bottom ruled line rolls 29 also in the bottom head 62, and to equip it with still more bottom ruled line rolls with which tip configurations differ mutually. [ as well as / for example, / the upper head 61 ]

[0029] Anyway, a configuration setup is carried out so that it may correspond to the various kinds of the corrugated paper sheet 31, and each up ruled line roll and each Shimo ruled line roll can use a respectively required roll now alternatively from two or more upper ruled line rolls and the bottom ruled line roll of plurality. Furthermore, if the so-called order modification, such as a class of corrugated paper sheet 31 which a slitting machine scorekeeper is made to process, a width dimension to cut, and spacing of a ruled line, is set up by the production control system (illustration abbreviation) The optimal combination of the upper ruled line rolls 11 and 12 and the bottom ruled line rolls 28 and 29 is determined. According to this decision, the controller (control means) which performs control about each cylinder 14 of the upper head 61 and control about the upper ruled line rolls 11 and 12 and the bottom ruled line rolls 28 and 29 and which is not illustrated is formed.

[0030] Moreover, also in this operation gestalt, the slitting machine scorekeepers M and N of two units are arranged in the \*\*\*\* direction of the corrugated paper sheet 31, and you may equip with an isomorphism-like thing mutually between each unit about a bottom ruled line roll on each of the slitting machine scorekeepers M and N of each unit, but it can also equip with that from which a configuration differs mutually also between each unit.

[0031] Since the slitting machine scorekeeper as 1 operation gestalt of this invention is constituted as mentioned above, if the so-called order modification, such as a class of corrugated paper sheet 31, a width dimension to cut, and spacing of a ruled line, is set up to a slitting machine scorekeeper, the optimal combination of the 1st top ruled line roll 11 and the 2nd top ruled line roll 12, the 1st bottom ruled line roll 28, and the 2nd bottom ruled line roll 29 will be

first determined through a controller by the production control system.

[0032] Subsequently, after each cylinder 14 of the upper head 61 prepared in a slitting machine scorekeeper's machine cross direction has developed through a controller (condition which all the up ruled line rolls 11 and 12 went up, and maintained the suitable skimmer between the 1st bottom ruled line roll 28 and the 2nd bottom ruled line roll 29), the rotation drive of the servo motor 4 is carried out independently respectively, and it moves in accordance with the \*\*\*\* shaft 2, and is set as a position. [ two or more ]

[0033] While the bottom head 62 of the plurality which attached the bottom ruled line rolls 28 and 29 in coincidence also rotates a driver 24 through an intermediate gear 25 and slides on a rail 20 top in accordance with the \*\*\*\* shaft 18 by the rotation drive of a drive motor 26, it moves to a position. And the optimal top, it is set up so that the combination of a bottom ruled line roll, for example, the concave at the tip of the upper ruled line roll 11 and the bottom ruled line roll 28, and a convex may agree, and the location of knife cradle 33a of the downstream and slitting machine knife 33b is also set up.

[0034] Next, with the driving gear which does not illustrate the hexagon-head shaft 19, a rotation drive is carried out, and it operates so that the peripheral speed of the bottom ruled line roll 28 may be in agreement with the travel speed of the corrugated paper sheet 31. And transit and coincidence of the corrugated paper sheet 31 are made to contract a cylinder 14, the upper ruled line roll 11 is dropped, the corrugated paper sheet 31 is pushed against the crevice of the bottom ruled line roll 28 by predetermined thrust, and ruled line processing is performed.

[0035] Furthermore, accurate ruled line processing can also be performed to a variety of corrugated paper sheets 31, such as equipping with the bottom ruled line roll beforehand on a configuration which is different to each of two units M and N, for example, corresponding to the corrugated paper sheet 31 of an A-C flute in one unit, and corresponding to a D-F flute in the unit of another side. When [ optimal ] making an order change again, and the classes of corrugated paper sheet 31 differ and it applies to this, since the bottom ruled line roll is attached beforehand and it is good only by selecting and setting up the optimal combination from each up one and a bottom ruled line roll, large time amount compaction can be aimed at.

[0036] That is, like before, draw out and it becomes unnecessary to exchange out of every engine frame and a system, and if it is going to change a bottom ruled line roll, large reduction of an effort and time amount is attained, and marked improvement in bending precision can be aimed at a top each time. Although a setup accompanying order modification explained above can be altogether performed automatically by setting it as the controller (on a control panel) which is not illustrated, such a setup may be performed manually.

[0037] As mentioned above, although the operation gestalt of this invention was explained, this invention is not limited to these operation gestalt, in the range which does not deviate from the meaning of this invention, can deform variously and can be carried out. For example, in each unit, as it forms the rise-and-fall arm by the side of an upper head and an upper ruled line roll, and 1 set of bottom ruled line roll of the frame side of a bottom head at a time, respectively and what is mutually different between each unit in the tip configuration of an upper ruled line roll and the tip configuration of a bottom ruled line roll is adopted, you may constitute so that it may be used according to the class of corrugated paper sheet 31, choosing a corresponding unit.

[0038]

[Effect of the Invention] As explained in full detail above, for example beforehand, on plurality with high operating frequency, according to the class of corrugated paper sheet to process, it can change into a bottom ruled line roll on the most suitable combination, and, according to the

slitting machine scorekeeper of this invention of claims 1 and 2, improvement in the bending precision of a corrugated paper sheet and reduction of a production cost can be attained now by incorporating a bottom ruled line roll.

[0039] If the tip configuration of each above-mentioned up ruled line roll and each Shimo ruled line roll is set up according to the class of regular corrugated paper sheet, improvement in the bending precision of a corrugated paper sheet and reduction of a production cost can be attained more certainly. Furthermore, if it controls to use two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality according to the class of corrugated paper sheet to process, choosing them automatically, the production precision and productive efficiency of a corrugated paper sheet can be raised further.

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## TECHNICAL FIELD

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[Field of the Invention] This invention relates to the slitting machine scorekeeper who performs ruled line ON processing and slit processing along the flow direction of a corrugated paper sheet in the colgater which manufactures a corrugated paper sheet.

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## PRIOR ART

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[Description of the Prior Art] In the colgater which manufactures a corrugated paper sheet, the broad corrugated paper sheet continuously manufactured with the colgater line is sent to a slitting machine scorekeeper, it \*\*\*\*s at the narrow web (two or more webs usually) of width of face predetermined with a slitting machine to a flow direction, and ruled line processing for making a corrugated paper sheet easy to bend by the scorekeeper is performed.

[0003] Drawing 6 shows a common self-propelled slitting machine scorekeeper's configuration. As are shown in drawing 6 , and a slitting machine scorekeeper usually shows by M and N, it consists of two units arranged in \*\*\*\*\* of a corrugated paper sheet, and while one unit works, the unit of another side is made to perform dead works, such as setting \*\*\*\*, for lot modification. Each units M and N are constituted similarly, and in drawing 6 , both units are distributed and they are describing the sign so that the sign of the component of each unit may not crowd. Moreover, the arrow head in drawing 6 shows the transit direction of the corrugated paper sheet 31.

[0004] Upper ruled line equipment 65 and down-stream ruled line equipment 66 are countered and arranged in each units M and N focusing on the frame 35. The slitting machine 64 for cutting the corrugated paper sheet 31 in the transit direction is formed in the downstream part of each units M and N, and this slitting machine 64 is a pair as knife cradle 33a and slitting machine knife 33b sandwich the corrugated paper sheet 31. The trim duct 34 is formed in the nearest to down-stream of a slitting machine 64.

[0005] Upper ruled line equipment 65, down-stream ruled line equipment 66, and two or more sets (in the case of four-dish \*\* usually 8 sets of ruled lines, 5 sets of slitting machines) of slitting machines 64 are formed in the cross direction of the corrugated paper sheet 31, and two or more ruled line processings and cutting processings are performed to coincidence. Drawing 7 is the top view showing the situation of performing ruled line processing and \*\* picking, and

shows the example of four-dish picking. As shown in drawing 7 , the stand 35 is being fixed to the engine frames 67a and 67b set up by the both-sides side, and the rail 36 is being fixed to the stand 35 by the cross direction of the corrugated paper sheet 31. The arrow head in drawing 7 shows the transit direction of the corrugated paper sheet 31.

[0006] Although explained in full detail behind, upper ruled line equipment 65 and down-stream ruled line equipment 66 move along with a rail 36, and can be set now as the location of the arbitration of the cross direction in the corrugated paper sheet 31, and a slitting machine 64 can set them as the location of arbitration similarly. If the corrugated paper sheet 31 from a colgater line is now introduced into a slitting machine scorekeeper, ruled line processing is respectively performed by upper ruled line equipment 65 and down-stream ruled line equipment 66, and it will be cut by the slitting machine 64 in the transit direction, and will be sent to degree process.

[0007] At this time, a part larger than the predetermined width of the corrugated paper sheet 31, i.e., the handle part of both ends, is cut to band-like, and it draws in and processes into the trim duct 34. In addition, as drawing 7 shows having divided the ruled line equipments 65 and 66 into the upstream and the downstream, and arranging them alternately, the narrow thing of spacing between adjoining ruled lines is more common than a slitting machine, and it is because spacing between ruled lines can be contracted, without the adjoining ruled line equipments 65 and 66 interfering mutually.

[0008] Next, if upper ruled line equipment 65 and down-stream ruled line equipment 66 are explained to a detail, it is only that the part became an opposite kitchen, and since structure and the function are completely the same, both 65 and 66 will explain down-stream ruled line equipment 66 here. The upper head 61 and the bottom head 62 become a pair in the vertical direction, and down-stream ruled line equipment 66 is constituted, as shown in drawing 6 .

[0009] First, the configuration of the upper head 61 is explained. As shown in drawing 6 and drawing 8 , the rail 36 is being fixed to the stand 35 by the cross direction of the corrugated paper sheet 31, and the frame 37 is attached in the rail 36 possible [ sliding ]. By the pin 38, the arm 39 is attached in the lower part of a frame 37 free [ rotation ]. Upper ruled line roll 32a is attached in one point of an arm 39 through bearing by the pin 40. And the cylinder 41 is attached between other points of an arm 39, and a frame 37, by telescopic motion of a cylinder 41, an arm 39 rotates centering on a pin 38, and upper ruled line roll 32a goes up and down up and down.

[0010] The servo motor 42 is attached in the upper part of a frame 37, and the driver 46 which fixed the servo motor 42 to the nut 45 of a ball thread which gets into gear on the \*\*\*\* shaft 44 through an intermediate gear 43 by carrying out a rotation drive is rotated. Therefore, while the nut 45 of a ball thread carries out forward inverse rotation in accordance with the \*\*\*\* shaft 44 and a frame 37 slides on a rail 36 top by carrying out the forward inversion of the servo motor 42, it can move to right and left and upper ruled line roll 32a can be set as the location of the arbitration of the cross direction in the corrugated paper sheet 31.

[0011] Next, the configuration of the bottom head 62 is explained. The stand 47 is being fixed to the engine frames 67a and 67b (refer to drawing 7 ) set up by the right-and-left both-sides side as shown in drawing 6 . On the stand 47, the rail 48 is attached in the cross direction of the corrugated paper sheet 31, and the frame 49 is attached possible [ sliding ] on the rail 48. As shown in drawing 6 and drawing 9 , in the upper part of a frame 49, the hexagon-head shaft 55 is attached in the engine frames 67a and 67b set up by the both-sides side free [ rotation ], and bottom ruled line roll 32b is being fixed to the bush 56 attached in the hexagon-head shaft 55 possible [ sliding ]. And bottom ruled line roll 32b is supported by the frame 49 free [ rotation ] through bearing 57, and bottom ruled line roll 32b rotates by carrying out a rotation drive with

the driving gear which does not illustrate the hexagon-head shaft 55.

[0012] The frame 49 is connected with the nut 52 of a ball thread through bearing 50 in the lower part. And the nut 52 of a ball thread has geared with the \*\*\*\* shaft 51 fixed between engine-frame 67a and 67b. The driver 53 is being fixed to the nut 52 of a ball thread by the end face of one of these, and a driver 53 rotates a drive motor 54 in the forward inversion direction through an intermediate gear by carrying out a forward inversion drive. Consequently, a frame 49 moves to the location of arbitration on either side in accordance with the \*\*\*\* shaft 51, sliding on a rail 48 top.

[0013] Therefore, when the bottom head 62 \*\*\*\*s, it moves to a position in accordance with a shaft 51 and the upper head 61 also drives a servo motor 42 to coincidence with a drive motor 54, in accordance with the \*\*\*\* shaft 44, it moves to a position, and in order to perform ruled line processing, it is set up a top so that the bottom ruled line rolls 32a and 32b may agree. And drive rotation of the hexagon-head shaft 55 is carried out, subsequently a cylinder 41 is driven, upper ruled line roll 32a is forced on bottom ruled line roll 32b for the corrugated paper sheet 31 by suitable thrust through an arm 39, and ruled line processing is performed so that the peripheral speed of bottom ruled line roll 32b and the travel speed of the corrugated paper sheet 31 may become equal.

[0014] Moreover, a setup of two or more sets of upper heads 61 prepared in the cross direction of the corrugated paper sheet 31 and the bottom head 62 is performed respectively independently to coincidence, predetermined spacing can be maintained and two or more ruled line processings can be performed to coincidence. As a part for the point which touches the corrugated paper sheet 31 of the bottom ruled line rolls 32a and 32b is shown in drawing 10 a top, upper ruled line roll 32a becomes a convex, and bottom ruled line roll 32b has become concave.

[0015] And are shown in the tip configuration of bottom each ruled line rolls 32a and 32b, i.e., drawing 10 , a top. The width (S) of a slot, the depth (H), a tilt angle (theta), a radius of circle (R) and the width of a projection, height (h), a tilt angle (theta), a radius of circle (r), etc. (s) In order for optimum values to differ and to improve bending precision after ruled line processing according to the class of corrugated paper sheet 31 supplied, an ideal uses the bottom ruled line rolls 32a and 32b on the optimal combination for every class of corrugated paper sheet 31.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] As explained in full detail above, for example beforehand, on plurality with high operating frequency, according to the class of corrugated paper sheet to process, it can change into a bottom ruled line roll on the most suitable combination, and, according to the slitting machine scorekeeper of this invention of claims 1 and 2, improvement in the bending precision of a corrugated paper sheet and reduction of a production cost can be attained now by incorporating a bottom ruled line roll.

[0039] If the tip configuration of each above-mentioned up ruled line roll and each Shimo ruled line roll is set up according to the class of regular corrugated paper sheet, improvement in the bending precision of a corrugated paper sheet and reduction of a production cost can be attained more certainly. Furthermore, if it controls to use two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality according to the class of corrugated paper sheet to process, choosing them automatically, the production precision and productive efficiency of a corrugated paper sheet can be raised further.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, a top, it is necessary to pull out and to exchange out of a system, the up-and-down stand 35 and the whole stand 47, exchange of the bottom ruled line rolls 32a and 32b takes a great effort and time amount, the operating ratio fall of equipment is invited to it, and it becomes the factor of a cost rise. Furthermore, a wave amplitude also has A flute to F flute in the corrugated paper sheet 31, and, recently, even the micro flute is put in practical use. Since it is not practical to be to a single (one step), double (two steps), and triple (three steps) one, and to exchange the bottom ruled line rolls 32a and 32b a top for every class of these corrugated paper [ all ] sheets 31 also in stage formation each time, The present condition is making bending precision into a sacrifice to some extent, and supporting the class of wide range corrugated paper sheet 31 with the bottom ruled line rolls 32a and 32b on one configuration.

[0017] As it was originated in view of the above-mentioned technical problem and this invention can be changed into a bottom ruled line roll on the most suitable combination according to the class of corrugated paper sheet which incorporates the bottom ruled line roll on plurality with beforehand high operating frequency, for example, is processed, it aims at offering the slitting machine scorekeeper who enabled it to attain improvement in the bending precision of a corrugated paper sheet, and reduction of a production cost.

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## MEANS

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[Means for Solving the Problem] For this reason, the slitting machine scorekeeper of this invention according to claim 1 In the transit direction of the corrugated paper sheet from a colgater line, while carrying out ruled line processing In the slitting machine scorekeeper who has the upper head arranged as sandwiched this corrugated paper sheet that is the slitting machine scorekeeper who cuts in the transit direction, and runs this corrugated paper sheet, and a bottom head Two or more rise-and-fall arms respectively prepared in the frame of this upper head independently possible [ rise and fall ], Two or more upper ruled line rolls which were formed at the tip of each above-mentioned arm, respectively and with which tip configurations differ mutually, The bottom ruled line roll of the plurality from which a tip configuration differs mutually formed in the frame of the bottom head of this, respectively is offered, and it is characterized by constituting alternatively two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality usable.

[0019] Moreover, the slitting machine scorekeeper of this invention according to claim 2 In the transit direction of the corrugated paper sheet from a colgater line, while carrying out ruled line processing He is the self-propelled slitting machine scorekeeper who cuts this corrugated paper sheet in the transit direction. The slitting machine scorekeeper who has the upper head arranged as sandwiched this corrugated paper sheet it runs, and a bottom head Multi-unit preparation and the rise-and-fall arm prepared in the frame of this upper head in the slitting machine scorekeeper of each above-mentioned unit, The upper ruled line roll formed at the tip of this arm, respectively and the bottom ruled line roll formed in the frame of the bottom head of this in the slitting

machine scorekeeper of each above-mentioned unit are offered. The tip configuration of this upper ruled line roll and the tip configuration of the bottom ruled line roll of this are characterized by constituting alternatively two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality usable while a mutually different thing between each unit is adopted.

[0020] As for the tip configuration of each above-mentioned up ruled line roll and each Shimo ruled line roll, it is desirable to be set up according to the class of regular corrugated paper sheet. Furthermore, it is also desirable that control is performed so that two or more above-mentioned upper ruled line rolls and the bottom ruled line roll of plurality may be used according to the class of corrugated paper sheet to process, choosing them automatically.

[0021]

[Embodiment of the Invention] Hereafter, a drawing explains the gestalt of operation of this invention. The typical side elevation in which drawing 1 - drawing 5 show the slitting machine scorekeeper as 1 operation gestalt of this invention, and drawing 1 shows the configuration of the upper head, the typical side elevation in which in drawing 2 the direction view Fig. of A of drawing 1 and drawing 3 show the B-B view sectional view of drawing 1 , and drawing 4 shows the configuration of the upper head, and drawing 5 are the C-C view sectional views of drawing 4 .

[0022] Since it is the same as usual about fundamental configuration and function of the self-propelled slitting machine scorekeeper concerning this operation gestalt, these explanation is omitted and explains a characteristic part. First, the upper head 61 of the slitting machine scorekeeper concerning this operation gestalt is explained.

[0023] By the slitting machine scorekeeper concerning this operation gestalt, as shown in drawing 1 , drawing 2 , and drawing 3 , it constructs horizontally across the engine frames 67a and 67b (refer to drawing 7 ) set up by a slitting machine scorekeeper's both-sides side (not shown a field parallel to the space in drawing 1 , and here), the stand 35 is being fixed, and the rail 1 and the \*\*\*\* shaft 2 are being fixed to the stand 35 by the machine cross direction (direction perpendicular to the space in drawing 1 ). The frame 3 is attached in the rail 1 possible [ sliding ], the servo motor 4 was attached in the upper part of a frame 3, and the gearing 5 fixed to the output shaft of a servo motor 4 meshes with a driver 7 through an intermediate gear 6. This driver 7 is being fixed to the nut 8 of a ball thread which gets into gear on the \*\*\*\* shaft 2.

[0024] The arm (rise-and-fall arm) 10 which is plurality (here 2) is attached respectively independently in the pin 9 prepared in the lower limit of a frame 3 free [ rotation ]. The ruled line roll 11 when [ 1st ] tip configurations differ respectively, and the 2nd top ruled line roll 12 are attached at one tip of each arm 10 free [ rotation ]. By the pin 13, one edge of a cylinder 14 is attached free [ rotation ], and the other end of a cylinder 14 is connected at the tip of another side of each arm 10 by the height 15 and pin 16 of a frame 3 free [ rotation ].

[0025] In this operation gestalt, although the case where it equipped with two upper ruled line rolls, the 1st and the 2nd, 11 and 12 was explained, what three or more arms 10 are formed, of course, and an upper ruled line roll is attached in each arm 10 also for, respectively (that is, it equips with three or more upper ruled line rolls) can be carried out easily. Thus, two or more (for example, about 8 sets) arrangement of the upper head 61 equipped with two or more upper ruled line rolls 11 and B12 is usually carried out on the same \*\*\*\* shaft, and the location is possible independently respectively.

[0026] Next, the bottom head 62 of the slitting machine scorekeeper concerning this operation gestalt is explained. As shown in drawing 4 and drawing 5 , it constructs horizontally across the

engine frames 67a and 67b (refer to drawing 7 ) set up by a slitting machine scorekeeper's both-sides side (not shown a field parallel to the space in drawing 4 , and here), and the stand 17 is being fixed, it \*\*\*\*s to a stand 17 and the shaft 18 and the hexagon-head shaft 19 are attached in it free [ rotation ].

[0027] Furthermore, the rail 20 is being fixed to the stand 17. The frame 21 is attached in this rail 20 possible [ sliding ], and the frame 21 is connected with it through the nut 22 and bearing 23 of a ball thread which gear with the \*\*\*\* shaft 18. The driver 24 is being fixed to the nut 22 of this ball thread, and the rotation drive of the forward inverse rotation is enabled by the drive motor 26 through an intermediate gear 25.

[0028] The bottom ruled line roll 28 which is plurality from which a tip configuration differs respectively (here two pieces), i.e., the 1st bottom ruled line roll, and the 2nd bottom ruled line roll 29 are attached in the bush 27 established in the hexagon-head shaft 19 possible [ sliding ] on the other hand, and the bush 27 is further supported by the frame 21 through bearing 30.

Moreover, it is also possible to form a spacer suitable between the bottom ruled line rolls 29 also in the bottom head 62, and to equip it with still more bottom ruled line rolls with which tip configurations differ mutually. [ as well as / for example, / the upper head 61 ]

[0029] Anyway, a configuration setup is carried out so that it may correspond to the various kinds of the corrugated paper sheet 31, and each up ruled line roll and each Shimo ruled line roll can use a respectively required roll now alternatively from two or more upper ruled line rolls and the bottom ruled line roll of plurality. Furthermore, if the so-called order modification, such as a class of corrugated paper sheet 31 which a slitting machine scorekeeper is made to process, a width dimension to cut, and spacing of a ruled line, is set up by the production control system (illustration abbreviation) The controller which determines the optimal combination of the upper ruled line rolls 11 and 12 and the bottom ruled line rolls 28 and 29, and performs control about each cylinder 14 of the upper head 61, and control about the upper ruled line rolls 11 and 12 and the bottom ruled line rolls 28 and 29 according to this decision and which is not illustrated

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the typical side elevation showing the configuration of the upper head of the slitting machine scorekeeper concerning 1 operation gestalt of this invention.

[Drawing 2] It is the typical front view showing the configuration of the upper head of the slitting machine scorekeeper concerning 1 operation gestalt of this invention, and is the direction view Fig. of A of drawing 1 .

[Drawing 3] It is the typical sectional view showing the configuration of the upper head of the slitting machine scorekeeper concerning 1 operation gestalt of this invention, and is the B-B view sectional view of drawing 1 .

[Drawing 4] It is the typical side elevation showing the configuration of the upper head of the slitting machine scorekeeper concerning 1 operation gestalt of this invention.

[Drawing 5] It is the typical sectional view showing the configuration of the upper head of the slitting machine scorekeeper concerning 1 operation gestalt of this invention, and is the C-C view sectional view of drawing 4 .

[Drawing 6] It is the typical side elevation showing a common slitting machine scorekeeper's configuration.

[Drawing 7] It is the top view showing the situation that a slitting machine scorekeeper performs ruled line processing and \*\* picking.

[Drawing 8] It is the typical sectional view showing the configuration of a common slitting machine scorekeeper's upper head, and is the D-D view sectional view of drawing 6 .

[Drawing 9] It is the typical sectional view showing the configuration of the bottom head of a common slitting machine scorekeeper, and is the E-E view sectional view of drawing 6 .

[Drawing 10] It is the typical sectional view showing the configuration for a point of a bottom ruled line roll on a common slitting machine scorekeeper.

[Description of Notations]

- 1 Rail
- 2 Screw-Thread Shaft
- 3 Frame
- 4 Servo Motor
- 5 Gearing
- 6 Intermediate Gear
- 7 Driver
- 8 Nut of Ball Thread
- 9 Pin
- 10 Arm (Rise-and-Fall Arm)
- 11 1st Top Ruled Line Roll
- 12 2nd Top Ruled Line Roll
- 13 Pin
- 14 Cylinder
- 15 Height
- 16 Pin
- 17 Stand
- 18 Screw-Thread Shaft
- 19 Hexagon-Head Shaft
- 20 Rail
- 21 Frame
- 22 Nut of Ball Thread
- 23 Bearing
- 24 Driver
- 25 Intermediate Gear
- 26 Drive Motor
- 27 Bush
- 28 1st Bottom Ruled Line Roll
- 29 2nd Bottom Ruled Line Roll
- 30 Bearing
- 31 Corrugated Paper Sheet
- 32a Upper ruled line roll
- 32b Bottom ruled line roll
- 33a Knife cradle
- 33b Slitting machine knife
- 34 Trim Duct
- 35 Stand

36 Rail  
37 Frame  
38 Pin  
39 Arm  
40 Pin  
41 Cylinder  
42 Servo Motor  
43 Intermediate Gear  
44 Screw-Thread Shaft  
45 Nut of Ball Thread  
46 Driver  
47 Stand  
48 Rail  
49 Frame  
50 Bearing  
51 Screw-Thread Shaft  
52 Nut of Ball Thread  
53 Driver  
54 Drive Motor  
55 Hexagon-Head Shaft  
56 Bush  
57 Bearing  
61 Upper Head  
62 Bottom Head  
64 Slitting Machine  
65 Upper Ruled Line Equipment  
66 Down-stream Ruled Line Equipment  
67a, 67b Engine frame  
M, N A slitting machine scorekeeper's unit

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号  
特開2002-36399  
(P2002-36399A)

(43) 公開日 平成14年2月5日 (2002.2.5)

(51) Int.Cl. <sup>7</sup>	識別記号	F I	テーマコード* (参考)
B 3 1 F 1/10		B 3 1 F 1/10	3 C 0 2 7
B 2 6 D 1/24		B 2 6 D 1/24	E 3 E 0 7 8

審査請求 未請求 請求項の数 4 O L (全 8 頁)

(21) 出願番号 特願2000-219081 (P2000-219081)

(22) 出願日 平成12年7月19日 (2000.7.19)

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Fターム(参考) 3C027 WW08 WW09 WW17

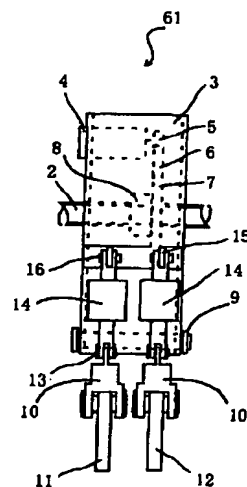
3E078 AA08 BB01 CE02X DD11

(54) 【発明の名称】 スリッタスコアラ

(57) 【要約】

【課題】 スリッタスコアラに関し、段ボールシートの折り曲げ精度の向上と生産コストの低減を達成できるようにする。

【解決手段】 段ボールシートの走行方向に野線加工すると共に、該段ボールシートを走行方向に切断するスリッタスコアラであって、上ヘッド61及び下ヘッドを有するスリッタスコアラにおいて、上ヘッド61のフレーム3に各々独立に昇降可能に設けられた複数個の昇降アーム10と、各々のアーム10の先端にそれぞれ設けられ互いに先端形状の異なる複数個の上野線ロール11、12と、該下ヘッドのフレームにそれぞれ設けられ互いに先端形状の異なる複数個の下野線ロールとをそなえ、上記の複数個の上野線ロール11、12及び複数個の下野線ロールを選択的に使用可能に構成する。



A 視

- 3: 上ヘッドのフレーム
- 10: アーム(昇降アーム)
- 11, 12: 上野線ロール
- 61: 上ヘッド

## 【特許請求の範囲】

【請求項1】 コルゲータラインからの段ボールシートの走行方向に野線加工すると共に、該段ボールシートを走行方向に切断するスリッタスコアラであって、走行する該段ボールシートを挟むようにして配設された上ヘッド及び下ヘッドを有するスリッタスコアラにおいて、該上ヘッドのフレームに各々独立に昇降可能に設けられた複数個の昇降アームと、  
上記の各々のアームの先端にそれぞれ設けられた互いに先端形状の異なる複数個の上野線ロールと、  
該下ヘッドのフレームにそれぞれ設けられた互いに先端形状の異なる複数個の下野線ロールとをそなえ、  
上記の複数個の上野線ロール及び複数個の下野線ロールを選択的に使用可能に構成されていることを特徴とする、スリッタスコアラ。

【請求項2】 コルゲータラインからの段ボールシートの走行方向に野線加工すると共に、該段ボールシートを走行方向に切断する自走式のスリッタスコアラであって、走行する該段ボールシートを挟むようにして配設された上ヘッド及び下ヘッドを有するスリッタスコアラを、複数ユニットそなえ、

上記の各ユニットのスリッタスコアラにおける該上ヘッドのフレームに設けられた昇降アームと、  
該アームの先端にそれぞれ設けられた上野線ロールと、  
上記の各ユニットのスリッタスコアラにおける該下ヘッドのフレームに設けられた下野線ロールとをそなえ、  
該上野線ロールの先端形状及び該下野線ロールの先端形状は、各ユニット間で互いに異なるものが採用されるときともに、

上記の複数個の上野線ロール及び複数個の下野線ロールを選択的に使用可能に構成されていることを特徴とする、スリッタスコアラ。

【請求項3】 上記の各上野線ロール及び各下野線ロールの先端形状は、規定の段ボールシートの種類に応じて設定されていることを特徴とする、請求項1又は2記載のスリッタスコアラ。

【請求項4】 加工する段ボールシートの種類に応じて、上記の複数個の上野線ロール及び複数個の下野線ロールを自動的に選択して使用するように制御が行なわれることを特徴とする、請求項1～3のいずれかの項に記載のスリッタスコアラ。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、段ボールシートを製造するコルゲータにおいて段ボールシートの流れ方向に沿って野入加工及びスリット加工を行なう、スリッタスコアラに関する。

## 【0002】

【従来の技術】段ボールシートを製造するコルゲータにおいて、コルゲータラインで連続的に製造された幅広の

段ボールシートは、スリッタスコアラに送られて、スリッタで流れ方向に所定の幅の幅狭ウェブ（通常は複数のウェブ）に断裁され、スコアラで段ボールシートを折り曲げ易くするための野線加工が施される。

【0003】図6は一般的な自走式のスリッタスコアラの構成を示したものである。図6に示すように、スリッタスコアラは、通常、M、Nで示すように、段ボールシートの走方向に配設された2つのユニットで構成されており、一方のユニットが稼動中に、他方のユニットは、ロット変更のために設定変えなどの準備作業を行なうようにしている。各ユニットM、Nは同様に構成されており、図6中では、各ユニットの構成要素の符号が密集しないように両ユニットに分散させて符号を記している。また、図6中の矢印は段ボールシート31の走行方向を示す。

【0004】各ユニットM、Nには、上流野線装置65及び下流野線装置66がフレーム35を中心に対向して配設されている。各ユニットM、Nの下流側部分には、段ボールシート31を走行方向に切断するためのスリッタ64が設けられており、このスリッタ64はナイフ受台33aとスリッタナイフ33bとが段ボールシート31を挟むようにして対になっている。スリッタ64の下流直近にはトリムダクト34が設けられている。

【0005】上流野線装置65、下流野線装置66及びスリッタ64は段ボールシート31の巾方向に複数組（4丁取の場合、通常、野線8組、スリッタ5組）設けられており、同時に複数の野線加工と断裁加工が行なわれる。図7は野線加工と丁取りを行なう状況を示す平面図であって、4丁取りの例を示している。図7に示すように、両側面に立設された架構67a、67bに架台35が固定されており、架台35には、段ボールシート31の巾方向にレール36が固定されている。図7中の矢印は段ボールシート31の走行方向を示す。

【0006】後に詳述するが、上流野線装置65、下流野線装置66はレール36に沿って移動し、段ボールシート31における巾方向の任意の位置に設定できるようになっており、スリッタ64も同様に任意の位置に設定できる。いま、コルゲータラインからの段ボールシート31がスリッタスコアラに導入されると、上流野線装置65及び下流野線装置66で各々野線加工が行われ、スリッタ64によって走行方向に切断され、次工程に送られる。

【0007】このとき、段ボールシート31の所定の巾よりも広い部分、即ち、両端の耳部を帯状に切断してトリムダクト34に吸引し処理する。なお、野線装置65、66を上流側と下流側に分けて千鳥状に配置しているのは、図7から分かるように、隣接する野線間の間隔はスリッタよりも狭いことが普通であり、隣接する野線装置65、66が互いに干渉することなく、野線間の間隔を縮めることができるようにするためである。

【0008】次に、上流野線装置65及び下流野線装置66について、詳細に説明すると、両者65、66は、一部が反対勝手に成っているのみで、構造・機能が全く同様であるため、ここでは、下流野線装置66について説明する。下流野線装置66は、図6に示すように、上ヘッド61と下ヘッド62とが上下方向に対になって構成されている。

【0009】まず、上ヘッド61の構成について説明する。図6及び図8に示すように、架台35に、段ボールシート31の巾方向にレール36が固定されており、レール36にフレーム37が摺動可能に取り付けられている。フレーム37の下部にはアーム39がピン38によって、回転自在に取り付けられている。アーム39の一方の先端部には、ピン40によって上野線ロール32aが軸受を介して取り付けられている。そして、アーム39の他の先端部とフレーム37との間にはシリンダ41が取り付けられており、シリンダ41の伸縮によって、アーム39がピン38を中心に回転し、上野線ロール32aが上下に昇降するようになっている。

【0010】フレーム37の上部にはサーボモータ42が取り付けられており、サーボモータ42を回転駆動することにより、中間歯車43を介して、ねじ軸44に噛合するボールねじのナット45に固定した駆動歯車46を回転するようになっている。したがって、サーボモータ42を正逆転することにより、ねじ軸44に沿ってボールねじのナット45が正逆回転し、フレーム37がレール36上を摺動しながら、左右に移動して、上野線ロール32aを段ボールシート31における巾方向の任意の位置に設定することができるようになっている。

【0011】次に、下ヘッド62の構成について説明する。左右両側面に立設された架構67a、67b（図7参照）には、図6に示すように、架台47が固定されている。架台47上に段ボールシート31の巾方向にレール48が取り付けられており、レール48上にはフレーム49が摺動可能に取り付けられている。図6、図9に示すように、フレーム49の上部において、六角シャフト55が、両側面に立設された架構67a、67bに、回転自在に取り付けられており、六角シャフト55に摺動可能に取り付けられたブッシュ56には下野線ロール32bが固定されている。そして、下野線ロール32bは軸受57を介して、回転自在にフレーム49によって支持されており、六角シャフト55を図示せざる駆動装置によって、回転駆動することにより、下野線ロール32bが回転するようになっている。

【0012】フレーム49は、その下部において、ボールねじのナット52に軸受50を介して連結されている。そして、ボールねじのナット52は架構67a、67b間に固定されたねじ軸51と噛合している。ボールねじのナット52には、その一方の端面に駆動歯車53が固定されており、駆動モータ54を正逆転駆動するこ

とにより、中間歯車を介して、駆動歯車53が正逆転方向に回転する。その結果、フレーム49はレール48上を摺動しながら、ねじ軸51に沿って、左右の任意の位置に移動するようになっている。

【0013】したがって、野線加工を行なうためには、駆動モータ54によって、下ヘッド62がねじ軸51に沿って所定の位置に移動し、同時に上ヘッド61もサーボモータ42を駆動することにより、ねじ軸44に沿って所定の位置に移動して、上、下野線ロール32a、32bが合致するように設定される。そして、下野線ロール32bの周速と段ボールシート31の走行速度が等しくなるように、六角シャフト55を駆動回転し、次いでシリンダ41を駆動して、アーム39を介して上野線ロール32aを適当な押圧力で段ボールシート31を下野線ロール32bに押し付け、野線加工を行なう。

【0014】また、段ボールシート31の巾方向に設けられている複数組の上ヘッド61及び下ヘッド62の設定は、各々独立して同時に行なわれるようになっており、所定の間隔を保って複数の野線加工を同時に行なうことができる。上、下野線ロール32a、32bの段ボールシート31に接する先端部分は、図10に示すように、上野線ロール32aは凸に下野線ロール32bは凹になっている。

【0015】そして、上、下各野線ロール32a、32bの先端形状、即ち、図10に示す、溝の巾（S）、深さ（H）、傾斜角（ $\Theta$ ）、丸み（R）、及び突起の巾（s）、高さ（h）、傾斜角（ $\theta$ ）、丸み（r）などは、供給される段ボールシート31の種類によって最適値が異なり、野線加工後の折り曲げ精度を良くするためには、段ボールシート31の種類毎に最適な組合せの上、下野線ロール32a、32bを用いるのが理想である。

【0016】

【発明が解決しようとする課題】しかしながら、上、下野線ロール32a、32bの交換には、上下の架台35及び架台47ごと系外に引き出して、交換する必要がある、多大な労力と時間を要し、装置の稼働率低下を招き、コストアップの要因となる。さらに、段ボールシート31には波形の大きさでも、AフルートからFフルートまであり、最近ではマイクロフルートまで実用化されている。段形成においても、シングル（1段）、ダブル（2段）、及びトリプル（3段）まであり、これらすべての段ボールシート31の種類毎に上、下野線ロール32a、32bをその都度交換することは実用的でないため、折り曲げ精度をある程度犠牲にして、一つの形状の上、下野線ロール32a、32bで広範囲の段ボールシート31の種類に対応しているのが現状である。

【0017】本発明は、上述の課題に鑑み創案されたもので、例えば予め使用頻度の高い複数個の上、下野線ロールを組み込んでおき、加工する段ボールシートの種類

に応じて、最も適当な組合せの上、下野線ロールに変更できるようにして、段ボールシートの折り曲げ精度の向上と生産コストの低減を達成できるようにした、スリッタスコアラを提供することを目的とする。

【0018】

【課題を解決するための手段】このため、請求項1記載の本発明のスリッタスコアラは、コルゲータラインからの段ボールシートの走行方向に野線加工すると共に、該段ボールシートを走行方向に切断するスリッタスコアラであって、走行する該段ボールシートを挟むようにして配設された上ヘッド及び下ヘッドを有するスリッタスコアラにおいて、該上ヘッドのフレームに各々独立に昇降可能に設けられた複数個の昇降アームと、上記の各々のアームの先端にそれぞれ設けられた互いに先端形状の異なる複数個の上野線ロールと、該下ヘッドのフレームにそれぞれ設けられた互いに先端形状の異なる複数個の下野線ロールとをそなえ、上記の複数個の上野線ロール及び複数個の下野線ロールを選択的に使用可能に構成されていることを特徴としている。

【0019】また、請求項2記載の本発明のスリッタスコアラは、コルゲータラインからの段ボールシートの走行方向に野線加工すると共に、該段ボールシートを走行方向に切断する自走式のスリッタスコアラであって、走行する該段ボールシートを挟むようにして配設された上ヘッド及び下ヘッドを有するスリッタスコアラを、複数ユニットそなえ、上記の各ユニットのスリッタスコアラにおける該上ヘッドのフレームに設けられた昇降アームと、該アームの先端にそれぞれ設けられた上野線ロールと、上記の各ユニットのスリッタスコアラにおける該下ヘッドのフレームに設けられた下野線ロールとをそなえ、該上野線ロールの先端形状及び該下野線ロールの先端形状は、各ユニット間で互いに異なるものが採用されるとともに、上記の複数個の上野線ロール及び複数個の下野線ロールを選択的に使用可能に構成されていることを特徴としている。

【0020】上記の各上野線ロール及び各下野線ロールの先端形状は、規定の段ボールシートの種類に応じて設定されていることが好ましい。さらに、加工する段ボールシートの種類に応じて、上記の複数個の上野線ロール及び複数個の下野線ロールを自動的に選択して使用するように制御が行なわれることも好ましい。

【0021】

【発明の実施の形態】以下、図面により、本発明の実施の形態について説明する。図1～図5は本発明の一実施形態としてのスリッタスコアラを示すもので、図1はその上ヘッドの構成を示す模式的な側面図、図2は図1のA方向矢視図、図3は図1のB-B矢視断面図、図4はその上ヘッドの構成を示す模式的な側面図、図5は図4のC-C矢視断面図である。

【0022】本実施形態にかかる自走式のスリッタスコ

アラの基本的な構成・機能については従来と同様であるのでこれらの説明は省略し、特徴的な部分について説明する。まず、本実施形態にかかるスリッタスコアラの上ヘッド61について説明する。

【0023】本実施形態にかかるスリッタスコアラでは、図1、図2及び図3に示すように、スリッタスコアラの両側面（図1中紙面に平行な面、ここでは図示せず）に立設された架構67a、67b（図7参照）に横架して、架台35が固定されており、架台35にはマシン巾方向（図1中紙面に垂直な方向）にレール1及びねじ軸2が固定されている。レール1にはフレーム3が摺動可能に取り付けられており、フレーム3の上部にはサーボモータ4が取り付けられ、サーボモータ4の出力軸に固定された歯車5は中間歯車6を介して、駆動歯車7に噛合している。この駆動歯車7は、ねじ軸2に噛合するボールねじのナット8に固定されている。

【0024】フレーム3の下端に設けられたピン9には、複数の（ここでは2本）のアーム（昇降アーム）10が、各々独立して回転自在に取り付けられている。各アーム10の一方の先端には、各々先端形状の異なる第1上野線ロール11及び第2上野線ロール12が回転自在に取り付けられている。各アーム10の他方の先端にはピン13によって、シリンダ14の一方の端が回転自在に取り付けられており、シリンダ14の他方の端は、フレーム3の突起部15とピン16とによって回転自在に連結されている。

【0025】本実施形態においては、第1及び第2の2個の上野線ロール11、12を装着した場合を説明したが、もちろん3本以上のアーム10を設けて各アーム10にそれぞれ上野線ロールを取り付ける（即ち、3個以上の上野線ロールを装着する）ことも容易に実施できる。このように複数個の上野線ロール11及びB12を装着した上ヘッド61は、通常、同一ねじ軸上に複数（例えば8組程度）配設され、各々独立に位置設定が可能になっている。

【0026】次に、本実施形態にかかるスリッタスコアラの下ヘッド62について説明する。図4及び図5に示すように、スリッタスコアラの両側面（図4中紙面に平行な面、ここでは図示せず）に立設された架構67a、67b（図7参照）に横架して、架台17が固定されており、架台17にはねじ軸18及び六角シャフト19が回転自在に取り付けられている。

【0027】さらに、架台17にはレール20が固定されている。このレール20には、フレーム21が摺動可能に取り付けられており、フレーム21はねじ軸18と噛合するボールねじのナット22と軸受23を介して連結されている。このボールねじのナット22には駆動歯車24が固定されており、中間歯車25を介して駆動モータ26によって正逆回転自在に回転駆動される。

【0028】一方、六角シャフト19に摺動可能に設け

られたブッシュ 27 には、各々先端形状の異なる複数の（ここでは 2 個）の下野線ロール、即ち、第 1 下野線ロール 28 及び第 2 下野線ロール 29 が取り付けられており、さらに、ブッシュ 27 は、軸受 30 を介してフレーム 21 によって支持されている。また、下ヘッド 62 にも、上ヘッド 61 と同様に、例えば下野線ロール 29 との間に適当なスペーサを設けて、互いに先端形状の異なる下野線ロールをさらに多く装着することも可能である。

【0029】いずれにしても、各上野線ロール及び各下野線ロールは、段ボールシート 31 の各種類に対応するように形状設定されており、複数の上野線ロール、複数の下野線ロールから、それぞれ必要なロールを選択的に使用できるようになっている。さらに、生産管理システム（図示略）により、スリッタスコアラに加工させる段ボールシート 31 の種類、切断する巾寸法、野線の間隔等、いわゆるオーダ変更が設定されると、上野線ロール 11、12 と下野線ロール 28、29 の最適な組合せを決定して、この決定に応じて、上ヘッド 61 の各シリンダ 14 に関する制御や、上野線ロール 11、12 及び下野線ロール 28、29 に関する制御を行なう図示しないコントローラ（制御手段）が、設けられている。

【0030】また、本実施形態の場合も、段ボールシート 31 の給走方向に 2 ユニットのスリッタスコアラ M、N が配設されており、各ユニットのスリッタスコアラ M、N のそれぞれの上、下野線ロールについては、各ユニット間で互いに同形状のものを装着してもよいが、各ユニット間でも互いに形状の異なるものを装着することもできる。

【0031】本発明の一実施形態としてのスリッタスコアラは、上述のように構成されているので、生産管理システムにより、スリッタスコアラに対し、段ボールシート 31 の種類、切断する巾寸法、野線の間隔等、いわゆるオーダ変更が設定されると、コントローラを通じて、まず、第 1 上野線ロール 11 及び第 2 上野線ロール 12 と第 1 下野線ロール 28 及び第 2 下野線ロール 29 の最適な組合せが決定される。

【0032】次いで、コントローラを通じて、スリッタスコアラのマシン巾方向に複数個設けてある上ヘッド 61 の各シリンダ 14 が伸長した状態（全上野線ロール 11、12 が上昇して、第 1 下野線ロール 28 及び第 2 下野線ロール 29 の相互間に相応のスキマを保った状態）で各々独立にサーボモータ 4 を回転駆動して、ねじ軸 2 に沿って移動し、所定の位置に設定される。

【0033】同時に、下野線ロール 28 及び 29 を取り付け付けた複数個の下ヘッド 62 も、駆動モータ 26 の回転駆動により、中間歯車 25 を介して駆動歯車 24 を回転して、ねじ軸 18 に沿ってレール 20 上を摺動しながら所定の位置に移動する。そして、最適な上、下野線ロールの組合せ、例えば上野線ロール 11 と下野線ロール 2

8 の先端の凹、凸が合致するように設定され、下流側のナイフ受台 33 a とスリッタナイフ 33 b の位置も設定される。

【0034】次に、六角シャフト 19 を図示せざる駆動装置によって、回転駆動し、下野線ロール 28 の周速が段ボールシート 31 の走行速度に一致するように運転する。そして、段ボールシート 31 の走行と同時にシリンダ 14 を収縮させ、上野線ロール 11 を降下させて、所定の押圧力で段ボールシート 31 を下野線ロール 28 の凹部に押し付けて野線加工を行なう。

【0035】さらに、2 ユニット M、N の各々に異なる形状の上、下野線ロールを予め装着しておき、例えば、一方のユニットで A～C フルートの段ボールシート 31 に対応し、他方のユニットで D～F フルードに対応するなど、より多種多様な段ボールシート 31 に対して、精度の良い野線加工を行なうこともできる。再びオーダ変更を行なうときには、段ボールシート 31 の種類が異なる場合においても、これに適用する最適な上、下野線ロールが予め取り付けられているため、各上、下野線ロールから最適組合せを選定し、設定するのみで良いので、大巾な時間短縮を図ることができる。

【0036】即ち、従来のように、上、下野線ロールを変更しようとする、その都度、架構ごと、系外に引抜いて交換する必要がなくなり、労力と時間の大巾な節減が可能になり、且つ、折り曲げ精度の格段の向上を図ることができる。以上説明したオーダ変更に伴う設定作業は、図示しないコントローラ（制御盤上）に設定することで全て自動的に行なうことができるが、このような設定を手動で行なってもかまわない。

【0037】以上、本発明の実施形態を説明したが、本発明はこれら実施形態に限定されるものではなく、本発明の趣旨を逸脱しない範囲で種々変形して実施することができる。例えば、各ユニットにおいて、上ヘッド側の昇降アーム及び上野線ロールと、下ヘッドのフレーム側の下野線ロールとを、それぞれ 1 組ずつだけ設けるようにして、上野線ロールの先端形状及び下野線ロールの先端形状を、各ユニット間で互いに異なるものを採用するようにして、段ボールシート 31 の種類に応じて、対応するユニットを選択して使用するように構成してもよい。

【0038】

【発明の効果】以上詳述したように、請求項 1、2 の本発明のスリッタスコアラによれば、例えば予め使用頻度の高い複数個の上、下野線ロールを組み込んでおくことで、加工する段ボールシートの種類に応じて、最も適当な組合せの上、下野線ロールに変更でき、段ボールシートの折り曲げ精度の向上と生産コストの低減とを達成できるようになる。

【0039】上記の各上野線ロール及び各下野線ロールの先端形状を、規定の段ボールシートの種類に応じて設

定すれば、段ボールシートの折り曲げ精度の向上と生産コストの低減とをより確実に達成できるようになる。さらに、加工する段ボールシートの種類に応じて、上記の複数個の上野線ロール及び複数個の下野線ロールを自動的に選択して使用するよう制御を行えば、段ボールシートの生産精度や生産効率を一層向上させることができる。

#### 【図面の簡単な説明】

【図1】本発明の一実施形態にかかるスリッタスコアラの上ヘッドの構成を示す模式的な側面図である。

【図2】本発明の一実施形態にかかるスリッタスコアラの上ヘッドの構成を示す模式的な正面図であって、図1のA方向矢視図である。

【図3】本発明の一実施形態にかかるスリッタスコアラの上ヘッドの構成を示す模式的な断面図であって、図1のB-B矢視断面図である。

【図4】本発明の一実施形態にかかるスリッタスコアラの上ヘッドの構成を示す模式的な側面図である。

【図5】本発明の一実施形態にかかるスリッタスコアラの上ヘッドの構成を示す模式的な断面図であって、図4

【図6】一般的なスリッタスコアラの構成を示す模式的な側面図である。

【図7】スリッタスコアラにより野線加工と丁取りを行なう状況を示す平面図である。

【図8】一般的なスリッタスコアラの上ヘッドの構成を示す模式的な断面図であって、図6のD-D矢視断面図である。

【図9】一般的なスリッタスコアラの下ヘッドの構成を示す模式的な断面図であって、図6のE-E矢視断面図

【図10】一般的なスリッタスコアラの上、下野線ロールの先端部分の形状を示す模式的な断面図である。

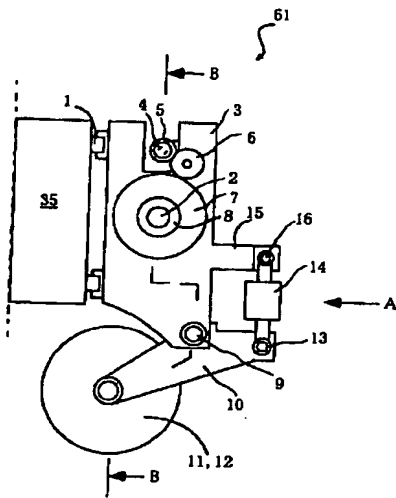
#### 【符号の説明】

- 1 レール
- 2 ねじ軸
- 3 フレーム
- 4 サーボモータ
- 5 歯車
- 6 中間歯車
- 7 駆動歯車
- 8 ボールねじのナット
- 9 ビン
- 10 アーム（昇降アーム）
- 11 第1上野線ロール
- 12 第2上野線ロール
- 13 ビン
- 14 シリンダ
- 15 突起部
- 16 ビン

- 17 架台
- 18 ねじ軸
- 19 六角シャフト
- 20 レール
- 21 フレーム
- 22 ボールねじのナット
- 23 軸受
- 24 駆動歯車
- 25 中間歯車
- 26 駆動モータ
- 27 ブッシュ
- 28 第1下野線ロール
- 29 第2下野線ロール
- 30 軸受
- 31 段ボールシート
- 32 a 上野線ロール
- 32 b 下野線ロール
- 33 a ナ이프受台
- 33 b スリッタナイフ
- 34 トリムダクト
- 35 架台
- 36 レール
- 37 フレーム
- 38 ビン
- 39 アーム
- 40 ビン
- 41 シリンダ
- 42 サーボモータ
- 43 中間歯車
- 44 ねじ軸
- 45 ボールねじのナット
- 46 駆動歯車
- 47 架台
- 48 レール
- 49 フレーム
- 50 軸受
- 51 ねじ軸
- 52 ボールねじのナット
- 53 駆動歯車
- 54 駆動モータ
- 55 六角シャフト
- 56 ブッシュ
- 57 軸受
- 61 上ヘッド
- 62 下ヘッド
- 64 スリッタ
- 65 上流野線装置
- 66 下流野線装置
- 67 a, 67 b 架構

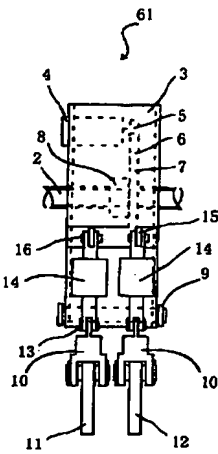
50 M, N スリッタスコアラのユニット

【図1】



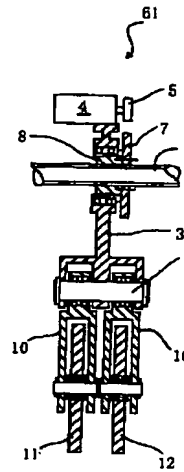
3:上ヘッドのフレーム  
10:アーム(昇降アーム)  
11, 12:上ガイドロール  
61:上ヘッド

【図2】



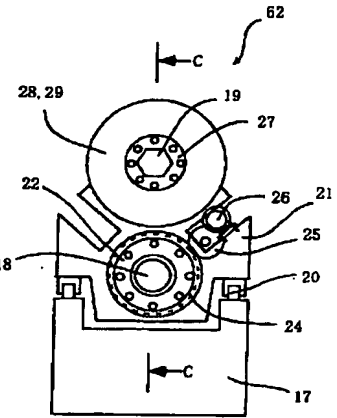
A 視  
3:上ヘッドのフレーム  
10:アーム(昇降アーム)  
11, 12:上ガイドロール  
61:上ヘッド

【図3】



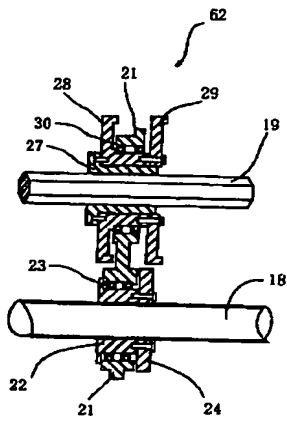
B-B 断面  
3:上ヘッドのフレーム  
10:アーム(昇降アーム)  
11, 12:上ガイドロール  
61:上ヘッド

【図4】



21:下ヘッドのフレーム  
28, 29:下ガイドロール  
62:下ヘッド

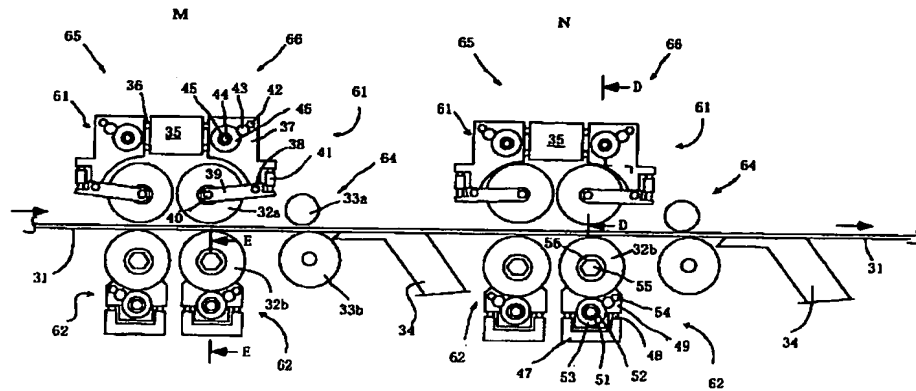
【図5】



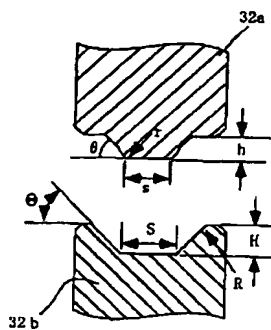
C-C 断面

21:下ヘッドのフレーム  
28, 29:下ガイドロール  
62:下ヘッド

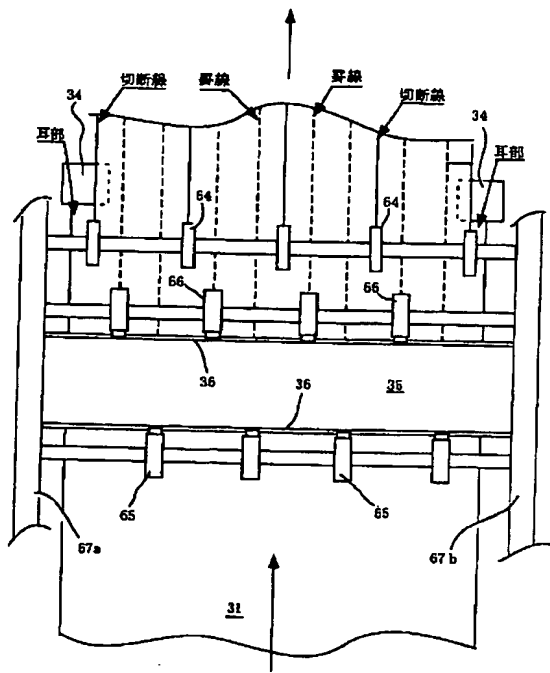
【図6】



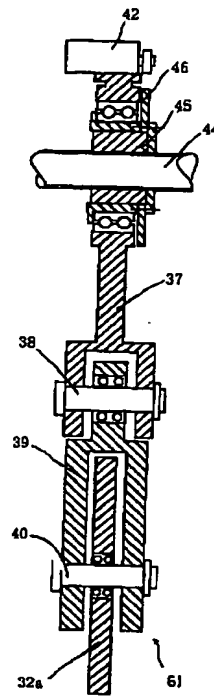
【図10】



【図7】

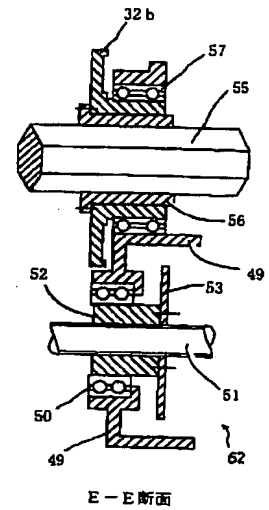


【図8】



D-D断面

【図9】



E-E断面

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